

10/541954

JC14 Rec'd PCT/PTO 08 JUL 2005

Express Mail Label #EV711807242US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN RE APPLICATION OF: ASGER GRAMKOW

FOR: SYSTEM FOR HANDLING A PERSON AND METHOD THEREFOR

CLAIM FOR PRIORITY UNDER 35 U.S.C. 119

The Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

Applicant hereby claims the benefit of the filing date of 15 January 2003 of Danish Patent Application No. PA 2003 00030 under the provisions of 35 U.S.C. 119 and the International Convention for the Protection of Industrial Property.

If any fees are due with regard to this claim for priority, please charge them to Deposit Account No. 06-1130 maintained by Applicant's attorneys.

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Date: JULY 8-2005



REC'D 23 FEB 2004

WIPO

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Kongeriget Danmark

Patent application No.: PA 2003 00030

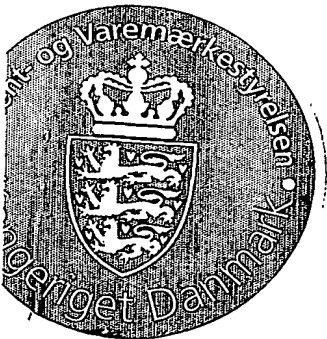
Date of filing: 15 January 2003

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Title: A method of handling a person, such as lifting or moving the person from a first position to another, with a handling system and a handling system.

IPC: A 61 G 7/14; A 61 G 7/10

Tis is to certify that the attached documents are exact copies of the above mentioned patent application as originally filed.



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Økonomi- og Erhvervsministeriet

04 February 2004

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PATENT- OG VAREMÆRKESTYRELSEN

Modtaget

15 JAN. 2003

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PVS

A METHOD OF HANDLING A PERSON, SUCH AS LIFTING OR MOVING THE PERSON FROM A FIRST POSITION TO ANOTHER, WITH A HANDLING SYSTEM AND A HANDLING SYSTEM.

Background of the invention

- 5 The present invention relates to a method of handling a person, such as lifting or moving the person from a first position to another, with a handling system and a handling system according to the preamble of claim 5.

- 10 The available systems for lifting disabled persons usually incorporate the use of a sling. The sling is suspended in a lifting arm of the system with at least four wires positioned in the corners of the sling sheet. The sling sheet forms a support, which the person is positioned in during the lifting.

- 15 The sling lift systems have the significant disadvantage of supplying poor and incorrect support for the person being lifted. Especially persons needing back or neck support will have problems being lifted with a sling lift system.

- 20 Further, the systems have the disadvantage of supporting the person in a rather baggy manner, which requires that the lifted person remains still or at least very careful when moving. If the person does not move carefully there is the risk of the person falling out of the sling or the lift tipping over.

- 25 The lift system with a sling requires that the lift is operated with the person being in a horizontal or semi horizontal position. This is seen as an undignified and insecure position by the lifted person and thus often affects the self-awareness of the person as well as the attitude towards being lifted.

- 30 Even further, the sling system often requires an assisting person, such as a nurse or a social worker, on each side of a bed in order to position the sling underneath the bedridden person. Rolling and moving the person from one bedside to another by the assistants allows the sling to be moved underneath the bedridden person.

Examples of sling lift systems are known from e.g. GB patent application no. GB-A 2 248 817 and European patent application no. EP-A2 0 931 533.

5 Another example of the prior art is known from International Patent Application No. WO-A 84/02074. The support system includes a frame with a number of frame arms being positioned under the person's seat and armpits as well as behind the back.

By using the system it is possible to move a person from one chair to another in which the person is in a sitting position during the movement.

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The system has the significant disadvantage of requiring that the disabled person can position himself in the system. Alternatively, an assisting person can position the frame arms underneath the seat and behind the back of the person when the person is in a chair or placed in a sitting position by the assistant.

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The well-known systems all require a significant amount of body control from the person to be moved. If the person does not have this ability, the assistants have to use a significant amount of force in order to prepare the movement. The need for using force in often awkward positions means that the assistant has the risk of getting (industrial) injuries to especially the arms and back. Alternatively, the assistant will have to call in further help in order to complete the movement of the person.

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An object of the invention is to create a method of lifting a person and a handling system that avoids the above-mentioned disadvantages.

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Especially, it is an object to create a method of handling a person and a handling system that requires no physical force from an assistant in preparation of the handling and during the handling.

30 Further, it is an object to create a method of handling a person and a handling system that is agreeable and dignifying for the person being e.g. lifted or moved.

Summary of the invention

The invention relates to a method of handling a person, such as lifting or moving the person from a first position to another, with a handling system including one or more support sheets initially positioned under the person, said method comprising the following steps: winding the one or more support sheets on at least two poles to a position in close proximity of the person's body, positioning one or more frames above said person and said at least two poles, connecting said one or more frames to said at least two poles, and handling the person by performing a lift in at least one of said one or more frames.

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The invention also relates to a handling device in which said handling system further comprises at least two poles (10) for winding said at least one support sheet (3, 6) from opposite sides of the sheet, wherein said poles establish a handling structure around the person.

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Hereby, it is possible to perform a lift of a person in a manner that differs from the well-known person lift systems and without the disadvantages of these systems. Especially it is possible to handle the person with little use of physical force from an assistant, as the assistant does not need to move the person in the preparing of lifting and during the lifting.

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When the assistant does not need to use physical force in preparing and performing the lifting it is possible, in a higher degree, to focus on the well being of the person being lifted instead of the lift and the lift process. Further, the lift process will be more acceptable to the person being lifted on a mental level.

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Further, it is possible to perform the lifting of person in a manner, which advantageously supports different parts of the person's body e.g. the neck and head.

Also the holding of the person from the front by frames and support from the back with sheets are advantageous as the person may feel a higher degree of safety not

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being able to fall or slide out of the holding device – in a forward or backward direction.

5 Further, the poles make the handling device more rigid and thus allow a support of the person that is more stable and reliable. This also makes it more comfortable and trustworthy for the person in the device.

10 As the poles are covered by the sheet material they will not make the device less comfortable compared with the prior art. At the same time the poles are positioned along parts of the person's body that usually are well-padded, such as the thighs and the sides of the back, and thus less sensitive to any load from the poles.

15 With the present method and handling device it is also possible to handle persons with fewer assistants due to the fact that the handling does not require physical strength of the assistants. This is especially advantageous as jobs within the healthcare sector involving handling of persons, such as nurse or social worker, are seen as jobs with a lower status and thus harder to fill with qualified people.

20 It should be emphasised that with the phrase "from a first position to another" may be understood as moving the person a distance or rotating the person in the same position allowing a different part of the person to face the position.

25 It should be emphasised that with the term "sheet" is meant a broad, relatively thin, layer, sail or covering of material such as material of linen, cotton, nylon, leather, plastic, rubber or combinations hereof. Usually, the sheet is in a material used as an article of bedding. It is preferred that the sheet is in a breathable or semi-breathable material in order to enhance the person's comfort when being in contact with the material over a longer time period.

30 It should be emphasised that with the term "support" is meant an arrangement that supports, carries and/or upholds a person.

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In an aspect of the invention, said connecting includes a locking or fixating process of said at least two poles to said one or more frames. Hereby, advantageous features have been achieved in relation to the invention, as the sheets cannot unwind the poles unintentionally.

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In another aspect, said one or more support sheets, in a non-use situation, are suspended and stretched out by said at least two poles connected to holding means e.g. connected to the sides of a bed. Hereby, it is possible to use the bed in a normal way without being disturbed by the sheets when the handling system is not in use, especially if the sheets are in a breathable material.

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In an aspect of the invention, said at least one support sheet includes an upper support sheet (6) and/or a lower support sheet (3), positioned under the upper and/or lower part of the person's body, respectively, e.g. under the back and head and under the seat or thighs of the person. Hereby, it is possible to create an advantageous handling system with a number of preferred functionalities.

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In an aspect of the invention, said system further comprises one or more frames (11, 17) such as a lifting frame (11) connected to said upper support sheet (3) through said at least two poles (10) and/or a support frame (17) connected to the lower support sheet (6) through at least two poles. Hereby, it is possible to create a handling system that handles a person in a gentle and dignifying manner e.g. by lifting the person in a system with a shape similar to an instructor chair.

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In an aspect of the invention, said lifting (11) and support frame (17) each includes a first and second frame part (19, 20, 26, 27) connected by a flexible intersection (21, 28). Hereby, it is possible to establish a controllable connection between the frame parts allowing the frames to be adapted to persons of different shapes.

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In an aspect of the invention, said lifting (11) and support frames (17) are connected by one or more straps (18) e.g. straps from said lifting frame (11) to each of said first and second frame part (19, 20) or said lifting and support sheets are connected with

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one or more bands (47, 48). Hereby, it is possible to establish a controllable connection between the frames.

5 In an aspect of the invention, said first position is a bed including said at least one support sheet (3, 6) and at least two holding devices (4, 5, 7) for said at least two poles (10) and said another position is a chair or similar means used in a sitting position, or vice versa. Hereby, it is possible to establish a system that is advantageous in daily use when lifting or moving a person. Further, the system may be a part of a standard bed such as a hospital bed without reducing the functionality of the bed.

10 In an aspect of the invention, said at least two holding devices (4, 5, 7) is positioned on one or more movable guide rails (45, 46) e.g. on the sides of a bed (1). Hereby, it is possible to adapt the bed to a given situation such as a high position when rotating or moving the person sideways and a low position under normal or lifting situations.

15 In an aspect of the invention, said guide rails (45, 46) comprises drive means, such as electric motors, connected to said at least two poles (10) allowing the poles to rotate clockwise or anticlockwise. Hereby, it is possible to control the person's movement in an advantageous way. Especially if the motors pull and hold, respectively, in the poles allowing very precise and small movements of the person.

20 The control of the motors may be performed by the person, an assistant or automatically e.g. after a time schedule ensuring that the bedridden person does not get a pressure sore.

The figures

The invention will be described in the following with reference to the figures, in which

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fig. 1 illustrates an initial position in the process of lifting a person from a bed with a lift system according to the invention,

- fig. 2 illustrates the first step in the lifting process in which an upper support sheet is positioned next to the person,
- 5 fig. 3 illustrates a further step in which a lifting frame is positioned above the torso of the person,
- fig. 4 illustrates the step of lifting the person to an up-right sitting position,
- 10 fig. 5 illustrates the step of arranging a support frame and a lower support sheet under the seat of the person,
- fig. 6 illustrates the step of lifting the person in the lift system,
- 15 fig. 7 illustrates a preferred embodiment of the lifting frame used in connection with the handling system,
- fig. 8 illustrates a further preferred embodiment of the lifting frame used in connection with the handling system,
- 20 fig. 9 illustrates an embodiment of a flexible intersection in a lifting or support frame,
- 25 fig. 10a and 10b illustrate different embodiments of frame locking systems,
- fig. 11a and 11b illustrate the method of locking a pole to a frame with the use of a locking system,
- 30 fig. 12a and 12b illustrate preferred embodiments of the pole and frame endings,
- fig. 13 illustrates an embodiment of the support sheets, and

fig. 14 illustrates a further embodiment of the invention.

Detailed description

5 Fig. 1 illustrates an initial position in the process of lifting a person 2 from a bed 1 with a handling system according to the invention.

The handling system includes an upper support sheet 3, which is positioned on the bed mattress under the upper part of the person's body 8. Preferably, the sheet is
10 positioned above the person's waistline such as under the back and head.

The upper support sheet 3 is winded up and stretched out by two poles at each side of the bed. Each of the poles is secured to the side of the bed by an upper and central holding device 4, 5 holding the ends of the pole.
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In a similar manner, a lower support sheet 6 is winded up and stretched out by two poles at each side of the bed. The central holding device 5 and a lower holding device 7 holding the ends of the pole secure each of the poles to the side of the bed.

20 The lower support sheet 6 is also positioned on the bed mattress but under the lower part of the person's body 9. Preferably, the sheet is positioned below the person's waistline such as under the person's seat or thighs.

In the figure, the sheets are illustrated as standard bed sheets which do not affect the
25 person during normal use of the bed.

Fig. 2 illustrates the first step in the lifting process in which an upper support sheet 3 is positioned next to the person. The support sheet is winded up on the pole 10 until it reaches the first side of the person 2's torso. Subsequently, the support sheet on the
30 other side of the person 2's torso is winded up on the pole belonging to the support sheet of this side (as illustrated in figure 3).

Fig. 3 illustrates a further step in which a lifting frame 11 is positioned above the torso of the person. The figure illustrates the lifting frame as two frame parts each comprising a substantially horizontal bar. The two parts are connected through two side sections each extending from the frame parts and meeting in a flexible intersection 28. The flexible intersection allows the frame parts to be moved further apart or together. The bar endings are connected to vertical rods with connection means. The connection means allow each pole to be suspended between two corresponding vertical rods after the flexible intersection has been adjusted - if necessary - in order to position the rods in proximity of the pole ends.

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At the suspension in between the rods the poles are locked by the connection means ensuring that the support sheet cannot unwind the poles unintentionally.

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The frame also comprises a left and right supporting element engaging with the armpits of the person being lifted.

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The frame construction will be further explained in connection with figure 7 and the functionality of the lifting frame will be apparent with the description of figure 4 to 6.

Fig. 4 illustrates the step of lifting the person to an up-right sitting position in the bed.

The lifting frame 11 is connected to the poles holding the upper support sheet 3 e.g. a pole to the frame 11 in a connection point 15 between the pole 10 and the lower rod of the frame. Further, the support elements are positioned under the person's armpits. The person is hereby supported at the back and head by the upper support sheet 3 and at the torso by the frame 11 and the support elements.

The frame is further connected to a lifting yoke 12 through rear and front lifting lines 13, 14 in each side of the frame. The rear lifting lines 13 are connected to the top of the lifting frame 11 and the front lifting lines 14 are connected to a lower point on the

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lifting frame 11. At the middle of the yoke, the lifting yoke 12 is also connected to a yoke lifting line 16.

5 The yoke lifting line 16 is illustrated as being pulled by an external power in an upward angle forcing the yoke and the lifting frame with the upper support sheet up and forward. The person will also be raised towards a sitting position in the bed by the pull.

10 The sitting position will preferably be a position in which the person's body forms an angle of more than 90 degrees e.g. more than 90 degrees and less than 120 degrees. The angle can be obtained by the person's back being slightly leaned backward from an upright position or the legs slightly downward from a horizontal position (most hospital beds allow sections of the bed to be lowered). By placing the person in a slightly more than 90 degree position a more optimal lifting position for the person is
15 obtained.

Fig. 5 illustrates the step of arranging a support frame 17 and a lower support sheet 6 under the seat or thighs of the person in a sitting position.

20 The lower support sheet 6 is winded up on the poles until they reach the sides of the person 2's seat or thighs. After the seat or thighs are reached the flexible intersection 21 of the support frame is adjusted in order to extend over the thighs of the person and in such a way that two frame parts 19, 20 in the support frame meet the ends of the poles. The poles are hereafter connected to the two frame parts 19, 20 in the
25 support frame. The connections between the poles and the frame parts 19, 20 are established in the same manner as described above in relation with figure 3.

After the connection of the poles and the frame parts each of the frame parts 19, 20 are attached to the frame parts of the lifting frame 11 by straps 18.

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With the support frame 17 and the lower support sheet 6 connected to the lifting frame 11 the person is supported at the upper part of the body as well as the lower part.

- 5 Fig. 6 illustrates the step of lifting the person in the handling system.

As the person is fully positioned in and supported by the handling system the person may be lifted up and away from the bed. The person is in the sitting position of the handling system under the full lifting process in which the functionality of the system
10 is similar to that of an instructor's chair.

Preferably, the support sheet is positioned under the person's thighs - in an anterior part of the thighs - in such a way that is possible for the person to use the facilities of a bathroom without leaving the handling system.

15

The yoke lifting line 16 is connected to the lift arm 23 of a lift 22 such as standard lift. The lift comprises a remote control 24 positioned at the lift 22 in a remote control holder 25.

- 20 The remote control 24 may control the motors of the lift e.g. with the use of a wireless connection from the remote control to the lift control system. Further, the remote control may control the electric means in connection with the bed such as electric motors winding up or unwinding the support sheets on the poles as explained in connection with figure 13.

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It should be understood that the lift process of fig. 1 to 6 may be reversed e.g. in order to lift a person from a chair to a bed with a handling system according to the invention.

- 30 Fig. 7 illustrates a preferred embodiment of the lifting frame 11.

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The lifting frame 11 comprises a left and right frame part 26, 27 in which each part includes a bar comprising an upper and lower connection rod 29 to 32. The bar is slightly angled down in the direction of the upper part e.g. with an angle between 5 and 25 degrees.

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The lower rods are perpendicular or substantially perpendicular connected to the end of the relevant bar. The upper rods are connected to the end of the relevant bar in a manner that makes them parallel with the lower rods. The rods all extend to positions being in the same physical plane.

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The rods include locking means allowing a pair of matching upper and lower rods to engage and retain a pole carrying a support sheet.

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Each of the frame parts also comprises a rod with a supporting element 33, 34 engaging with the person being lifted. The rod extends from the middle part of the bar e.g. substantially at the bend of the bar. The supporting element is illustrated as a curved cushion-coated furnishing that is attached to the frame part through the rod. Each of the supporting elements supports the person being lifted under and around the armpit.

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Each of the frame parts also comprises a side section extending from the sides of the frame parts and toward each other. The side sections, and thus the frame parts, are joined by a flexible intersection 28, e.g. a telescopic intersection, allowing the frame parts to move further apart or together.

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Fig. 8 illustrates a further preferred embodiment of the lifting frame used in connection with the handling system.

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The embodiment involves no use of the above-mentioned supporting elements in the lifting frame 11 and thus no supporting of the person being lifted under and around the armpit.

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The use of this lifting frame will be further described in connection with the embodiment of the support sheets illustrated in fig. 13.

- 5 It shall be emphasised that the frames – lifting and/or support frames – may come in different sizes and forms. The key element of a frame is the possibility of connecting to a pole in both ends of the frame.

- 10 The form of a lifting frame is preferably such that it may be used in connection with most shapes of torsos e.g. the frame and especially the frame intersection being elevated at the region of the stomach and/or the breast. In a similar manner, the form of the support frame is adapted to the person being lifted e.g. by ensuring that the intersection is well above the thighs of the person during the lifting process regardless of the size of the thighs.

- 15 Further, the frames may have different sizes allowing the system to be used in connection with small as well as tall people e.g. children and adults.

- 20 In a preferred embodiment of the lifting frame – with or without supporting elements – the left and right frame part 26, 27 comprises a handgrip area e.g. a foam rubber covered area. Hereby, the person being lifted is encouraged to hold on to the frame and thus enhance the firm link between the handling system and the person. The person will feel more in control of the situation and at the same time injuries to the person's arms are less likely to take place as the arms are held close to the frame.

- 25 The lifting and support frames may be made in metal preferably aluminium but also steel, iron or other metals may be used. In some embodiments the frames may also be constructed - partly or totally - in plastic materials or similar lightweight materials. If a higher degree of strength than possible with plastic materials is required glass fibre materials or other fibrous enforced material such as coal fibre materials may be used.

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Fig. 9 illustrates an embodiment of a flexible intersection in the lifting and/or support frame.

The two frame parts 12, 13 comprise a female 37 and male intersection part 39. When the male part is positioned in the female part in a preferred position a pin may be positioned in the holes 38, 40 of the parts and thus locking the parts together. In order to establish a number of different positions the female part comprises a number of holes.

In a further embodiment the female part may include a snap lock that scrolls over the hole of the male part during positioning but retains the male part if the parts are tried to be separated.

Figs. 10a to 10c illustrate different embodiments of frame locking systems.

Fig. 10a illustrates a frame part 12 - of a lifting or support frame - comprising a fixed extension 41 to the first frame rod. The fixed extension 41 expands substantially perpendicular to the rod.

Opposite the fixed extension 41 at the second rod a movable extension 42 is positioned. The movable extension 42 is illustrated as a piston that may be pushed in a direction toward the fixed extension through a hole in the rod and subsequently retracted again to the illustrated position.

By the combination of a fixed and movable extension 41, 42 it is possible to position a pole in between the extensions and with the movable extension lock the pole to the frame part 12.

Fig. 10b illustrates an embodiment in which both extensions are movable extensions. The flexibility of the pole locking is hereby enhanced.

Fig. 10c illustrates an embodiment in which both extensions are fixed extensions. This embodiment requires a flexibility of the frame part in a longitudinal direction in order to position the pole in between the rods.

It is important to emphasise that the fixed extension in its basic form only is fixed in the longitudinal direction. Both the extensions may be pivotally connected to the frame rods e.g. in such a way that a ratchet is created allowing the extensions to be
5 turned in one direction but not the opposite. This creates the functionality that a support sheet can be wound onto the pole but cannot unwind the pole unintentionally. This functionality is especially advantageous in the eventuality that the pole needs to be closer to the person's body after the frame has been locked to the pole.

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Fig. 11a and 11b illustrate the method of locking a pole to a frame with the use of a locking system.

Fig. 11a illustrates the first method step; positioning of a fixed extension of the frame
15 part in one pole end. The positioning is performed with the frame being slightly angled in relation to the pole in which the pole may e.g. be laying on a bed mattress in proximity of the person to be lifted.

Fig. 11b illustrates the final method step; after having moved the frame part down to
20 the same level as the pole the movable extension is in the process of being forced into the other end of the pole and thus locking the frame part to the pole.

Fig. 12a and 12b illustrate preferred embodiments of the pole and frame endings.

25 Fig. 12a illustrates the hollow end 10 of a pole together with a section of the sheet material 3. The internal surface of the pole comprises a number of longitudinal strengthening ribs 43 which extend in the full length of the pole.

Fig. 12b illustrates a fixed extension 41 extending from a frame rod 12. The fixed
30 extension may comprise a number of notches 44, which correspond in number and shape to the longitudinal strengthening ribs 43 of the pole.

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The internal surface of the pole may comprise any number of ribs e.g. more than ten ribs. The fixed and the movable extensions may comprise a triangular, square or a similar cross section that may engage a number of the notches created in between the ribs e.g. four notches engaged by a square cross section extension. Hereby, it is possible to create numerous different positions which the extensions may engage a pole.

The poles may in a preferred embodiment be made in aluminium with a diameter between 15 and 50 millimetres such as 25 millimetres.

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Fig. 13 illustrates an embodiment of the support sheets in which the upper 3 and lower support sheet 6 are connected by a first and second band 47, 48. One end of both bands is connected to the higher edge of the lower support sheet 6 preferably in a fixed manner. Further the connection is established close to the center of the of the support sheet in such a way that the bands are either underneath the person during use or in close proximity of the person.

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The other end of the bands is connected to the upper support sheet in close proximity of the lower sheet edge e.g. with the use of a releasable connection 53 e.g. a Velcro connection or lock.

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Further, the figure illustrates that the left and right pole 49, 50 for the lower support sheet are used in order to wind up the lower sheet support from opposite sides until the sides of the person (not illustrated) is reached.

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The figure also illustrates that the left and right pole 51, 52 for the upper support sheet are used in order to wind up the upper sheet support from opposite sides until the sides of the person (not illustrated) is reached.

Even further, it is illustrates that the poles 49-52 are moved or winded from the holding devices (illustrated in the figure only with the central holding device 5).

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The support sheets may preferably be used in connection with the lifting frame of fig. 8 with no armpit support. The person to be lifted is positioned with the upper part of the body on the upper support sheet and the lower part on the lower support sheet. The poles 51, 52 are positioned in close proximity of the person's upper body and the lower poles 49, 50 are positioned in close proximity of the person's lower body. The lifting frame is connected to the poles 51, 52 and the lifting process is initiated by connecting a lifting yoke 12 and a lift to the lifting frame.

During the lifting of the person to a sitting position the weight of the person ensures that the lower support sheet stays in place. The bands 47, 48 connecting the sheets further ensure that the upper sheet and the lifting frame are kept from moving upwards until the sitting position is reached. After the sitting position is reached or after the lifting and support frames are connected the sheets may be disconnected by releasing the band ends at the upper support sheet, e.g. releasing the Velcro locks.

Another embodiment in connection with the use of lifting frame of fig. 8 may involve straps between the two frames before lifting. After the sheets and poles are positioned at the side of the person the frames are connected to the poles. Hereafter straps are connected between the frames e.g. one strap connecting a lifting and supporting frame part.

During the lifting of the person to a sitting position the lifting frame is controlled by the straps but may move insignificantly upwards if they are not tighten throughout the process. After having reached the sitting position the straps are tighten to such an extent that the person may be lifted up and away from the bed (as illustrated in connection with fig. 6).

Fig. 14 illustrates a further embodiment of the invention in which the handling system is used to move the person 2 in the bed 1.

The movement of the person 2 is accomplished by turning the poles of the sheets in their holding devices 3, 5, 7 wherein the poles of one side unwind while the others

wind up. Hereby is created a sideways sheet flow that the person will follow either by moving with the sheet or by performing a rotating movement at the same position.

5 The type of movement is resolved by the angle of the pole performing the sheet winding up. The higher the poles are positioned above the bed mattress the more rotating and less sideways movement will the person perform.

10 The figure illustrates the bed with a permanent left and right guide rail 45, 46 wherein the rails are elevated above the mattress. The rails include the necessary poles as well as electric motor and control means in order to drive the poles when they are winding and unwinding the sheets.

15 In a preferred embodiment the electric motor means comprise a gear motor in each side of the bed allowing small and precise movements. The motors have connections to the end of the poles in their side of the bed. In the embodiment a motor drives the pole or poles performing the wind up of the sheet while the other motor either unwinds or is turned off (and thereby allowing the unwinding of the sheet).

20 The control of the motors may either be performed by an assistant or by the person in the bed with the use of a remote control such as the remote control also used at the lifting of the person. Further, the control may be automated e.g. using a time schedule ensuring that the bedridden person does not get a pressure sore.

25 In the embodiment, the guide rails are not permanently fixed to the bed but may be placed in different positions elevated above or in level with the mattress. The different positions for the rails may e.g. be obtained by a number of furnishings on the side of the bed or by bolts through the rails into threaded holes in the bed. Hereby, it is possible to adapt the bed to a given situation such as a high position when rotating or moving the person sideways and a low position under normal or
30 lifting situations.

The movement may be performed before the lifting process is initiated in order to position the person favourably in relation to the handling system or in general to move the person with the aid of the handling system.

- 5 It will also be understood that the invention is not limited to the particular examples described above but may be designed in a multitude of varieties within the scope of the invention, as specified in the claims. Especially the frame may be designed in a multitude of varieties such as being more rigid with further side sections. Further, the frame may be made in a number of materials such as steel, plastic or a composite material in order to achieve different functionalities e.g. strength, low cost or weight.
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- An example may comprise the use of the lifting frame 11 and the upper support sheet 3, positioned around the person to be lifted, and connected with the lifting yoke 12 (as especially described in connection with fig. 3 and 4). Instead of lifting the person to an up-right sitting position from a laying down position, the lift is continued until the person is at a horizontal level equal to the up-right standing position for the person. In the up-right standing position the person may walk and at the same time being supported by the lift. Further, the person may push or drag the lift with him without aid from an assistant.
- 15

- 20 Especially, the weight or strain on the person's body may be reduced e.g. if the person has a fractured leg or a similar disability, and at the same time the person is free to do different activities such as going to the bath room alone.

- 25 Further, the invention may be used in other situations than lifting persons from a bed e.g. by integrating the handling system in a chair or similar furniture.

- Beside the lift 22 any type of lifting mechanism may be used with the handling system e.g. a rail build into the ceiling above the person.
- 30

List

1. Bed
2. Person needing handling such as lifting or turning
3. Upper support sheet
- 5 4. Upper holding device
5. Central holding device
6. Lower support sheet
7. Lower holding device
8. Upper part of the person's body – above the waistline
- 10 9. Lower part of the person's body – below the waistline
10. Pole
11. Lifting frame
12. Lifting yoke
13. Rear lifting line
- 15 14. Front lifting line
15. Connection point between the pole and the lower connection rod of the left frame part
16. Yoke lifting line
17. Support frame
- 20 18. Connection straps
19. Left support frame part
20. Right support frame part
21. Lower flexible intersection
22. Lift
- 25 23. Lift arm
24. Remote control to control the lift
25. Holder for remote control
26. Left lifting frame part
27. Right lifting frame part
- 30 28. Upper flexible intersection
29. Upper connection rod of the left frame part
30. Lower connection rod of the left frame part

21

- 31. Upper connection rod of the right frame part
- 32. Lower connection rod of the right frame part
- 33. Left supporting element engaging with the person being lifted
- 34. Right supporting element engaging with the person being lifted
- 5 35. Left side section of the frame part
- 36. Right side section of the frame part
- 37. Female part
- 38. Holes in the female part
- 39. Male part
- 10 40. Hole in the male part
- 41. Fixed extension
- 42. Movable extension
- 43. Longitudinal strengthening ribs
- 44. Notch in the fixed extension
- 15 45. Left guide rail for the bed
- 46. Right guide rail for the bed
- 47. First band connecting the support sheets
- 48. Second band connecting the support sheets
- 49. Left pole for the lower support sheet
- 20 50. Right pole for the lower support sheet
- 51. Left pole for the upper support sheet
- 52. Right pole for the upper support sheet
- 53. Releasable connection such as a Velcro connection

Patent Claims

1. Method of handling a person, such as lifting or moving the person from a first position to another, with a handling system including one or more support sheets initially positioned under the person, said method comprising the following steps:
- 5 winding the one or more support sheets on at least two poles to a position in close proximity of the person's body,
- 10 positioning one or more frames above said person and said at least two poles,
- connecting said one or more frames to said at least two poles, and
- 15 handling the person by performing a lift in at least one of said one or more frames.
2. Method of handling a person according to claim 1 characterised in that said connecting includes a locking or fixating process of said at least two poles to said one or more frames.
- 20 3. Method of handling a person according to claim 1 or 2 characterised in that said one or more support sheets, in a non-use situation, are suspended and stretched out by said at least two poles connected to holding means e.g. connected to the sides of a bed.
- 25 4. Method of handling a person according to any of the claims 1 to 3 characterised in that handling of said one or more frames is performed by drive means, such as an electric motor connected to said one or more frames through lifting lines and a lift yoke.
- 30

5. Handling system for lifting or moving a person (2) from a first position to another, said system comprising

at least one support sheet (3, 6) for supporting the person's body during handling,

5

c h a r a c t e r i s e d i n t h a t

said handling system further comprises at least two poles (10) for winding said at least one support sheet (3, 6) from opposite sides of the sheet, wherein said poles establish a handling structure around the person.

10

6. Handling system according to claim 5 c h a r a c t e r i s e d i n t h a t said at least one support sheet includes an upper support sheet (6) and/or a lower support sheet (3), positioned under the upper and/or lower part of the person's body, respectively, e.g. under the back and head and under the seat or thighs of the person.

15

7. Handling system according to claim 5 or 6 c h a r a c t e r i s e d i n t h a t said system further comprises one or more frames (11, 17) such as a lifting frame (11) connected to said upper support sheet (3) through said at least two poles (10) and/or a support frame (17) connected to the lower support sheet (6) through at least two poles.

20

8. Handling system according to any of the claims 5 to 7 c h a r a c t e r i s e d i n t h a t said lifting (11) and support frame (17) each includes a first and second frame part (19, 20, 26, 27) connected by a flexible intersection (21, 28).

25

9. Handling system according to any of the claims 5 to 8 c h a r a c t e r i s e d i n t h a t said lifting (11) and support frames (17) are connected by one or more straps (18) e.g. straps from said lifting frame (11) to each of said first and second frame part (19, 20) or said lifting and support sheets are connected with one or more bands (47, 48).

30

10. Handling system according to any of the claims 5 to 9 characterised
in that said system comprises drive means, such as an electric motor of a
lift (22) connected to said one or more frames through lifting lines (13, 14) and a
5 lift yoke (12).
11. Handling system according to any of the claims 5 to 10
characterised in that said first position is a bed including
said at least one support sheet (3, 6) and at least two holding devices (4, 5, 7) for
10 said at least two poles (10) and said another position is a chair or similar means
used in a sitting position, or vice versa.
12. Handling system according to any of the claims 5 to 11
characterised in that at least two holding devices (4, 5, 7)
15 is positioned on one or more movable guide rails (45, 46) e.g. on the sides of a
bed (1).
13. Handling system according to any of the claims 5 to 12
characterised in that said guide rails (45, 46) comprises
20 drive means, such as electric motors, connected to said at least two poles (10)
allowing the poles to rotate clockwise or anticlockwise.

25

Abstract:

The invention relates to a method of handling a person, such as lifting or moving the person from a first position to another, with a handling system including one or more support sheets initially positioned under the person. The method comprising the following steps: winding the one or more support sheets on at least two poles to a position in close proximity of the person's body, positioning one or more frames above said person and said at least two poles, connecting said one or more frames to said at least two poles, and handling the person by performing a lift in at least one of said one or more frames.

The invention also relates to a handling system for lifting or moving a person from a first position to another.

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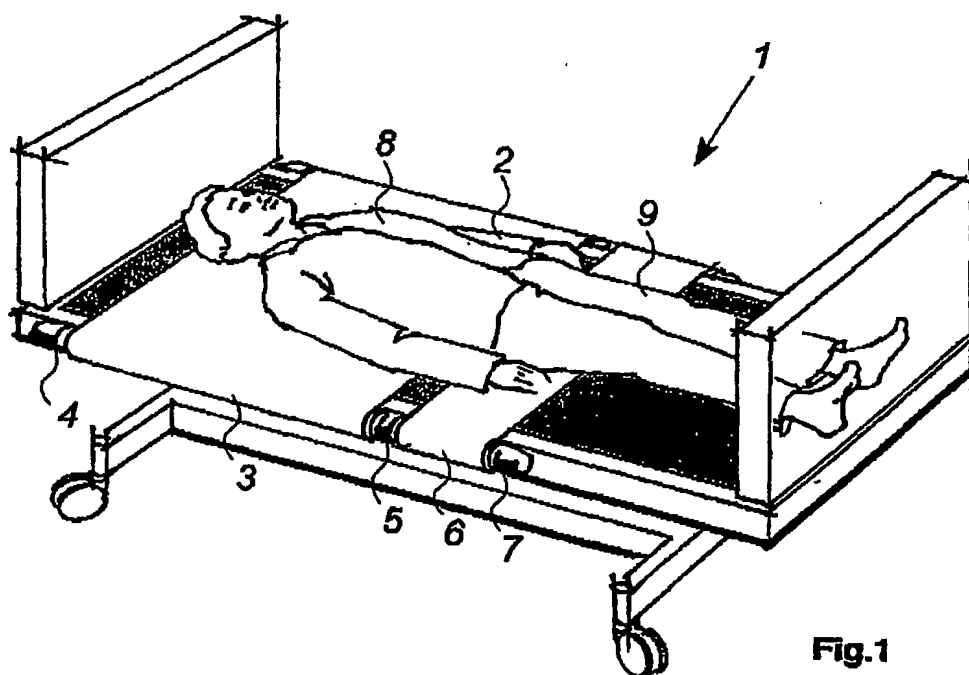


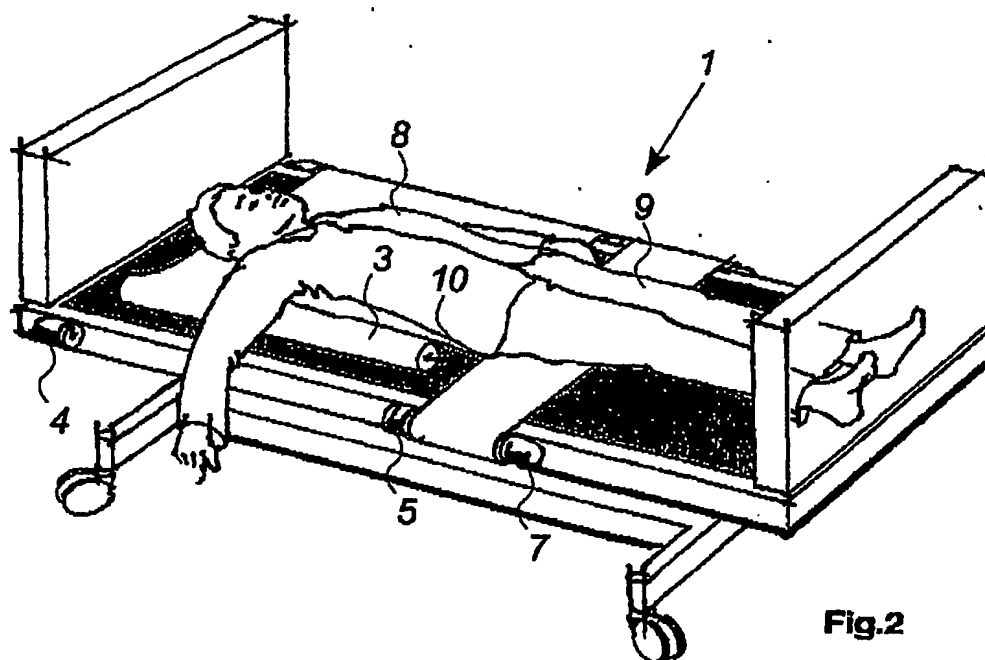
Fig.1

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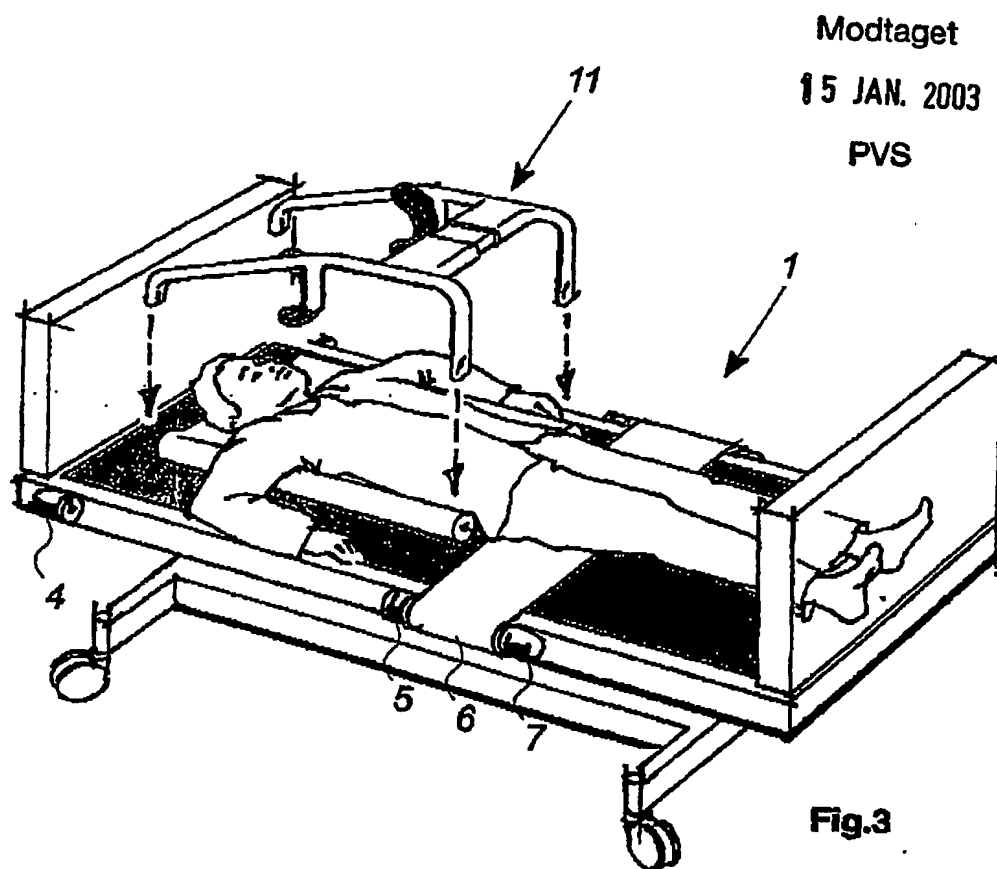
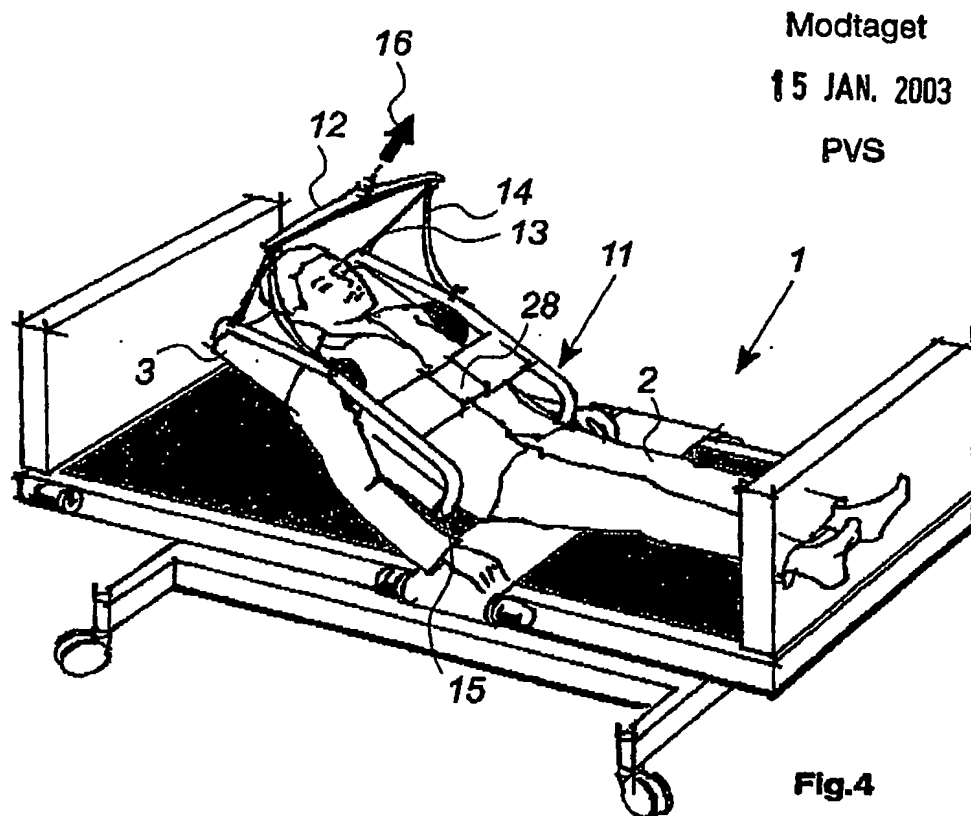
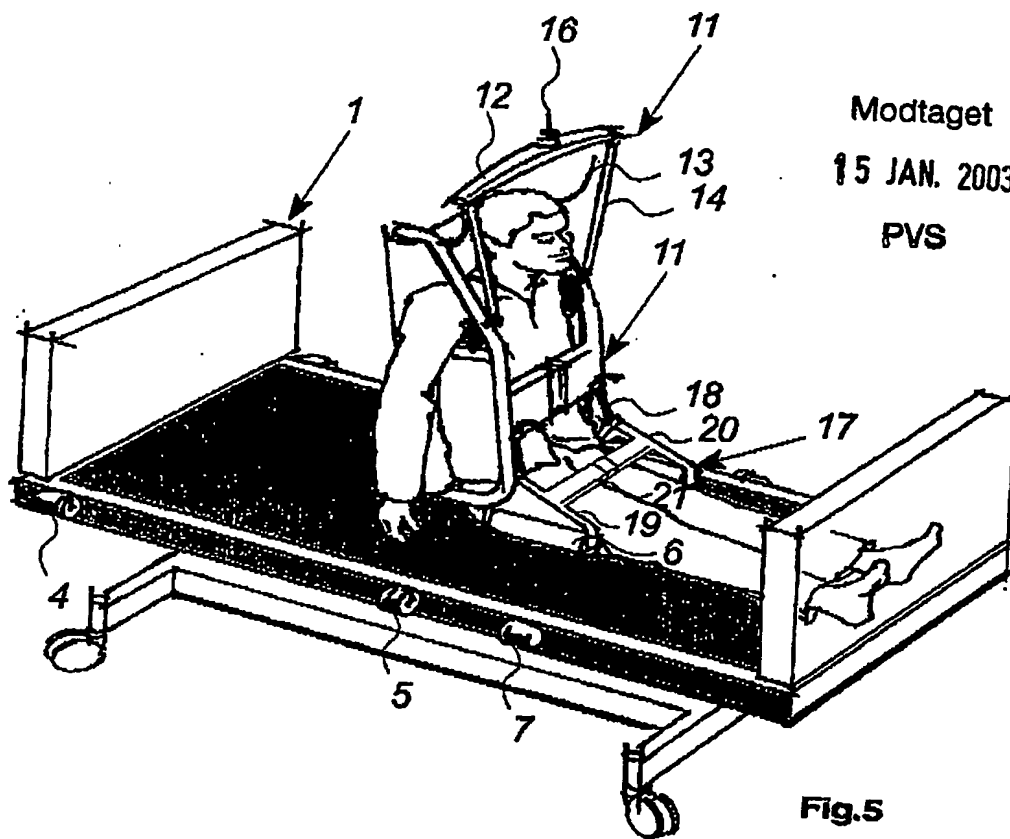


Fig.3

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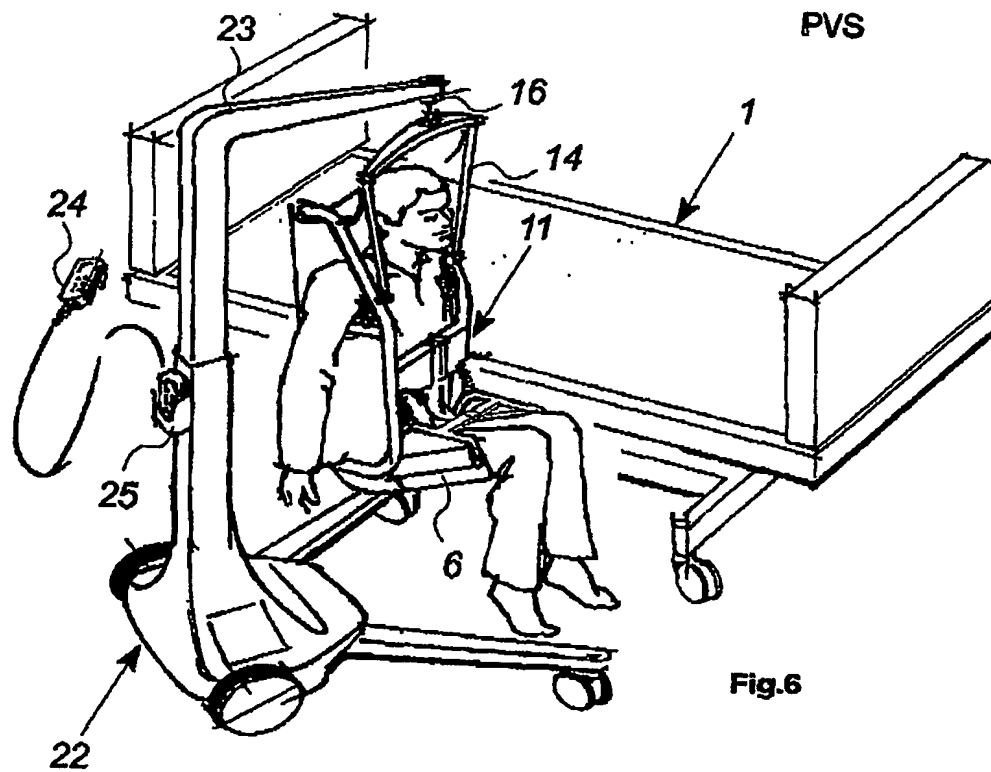


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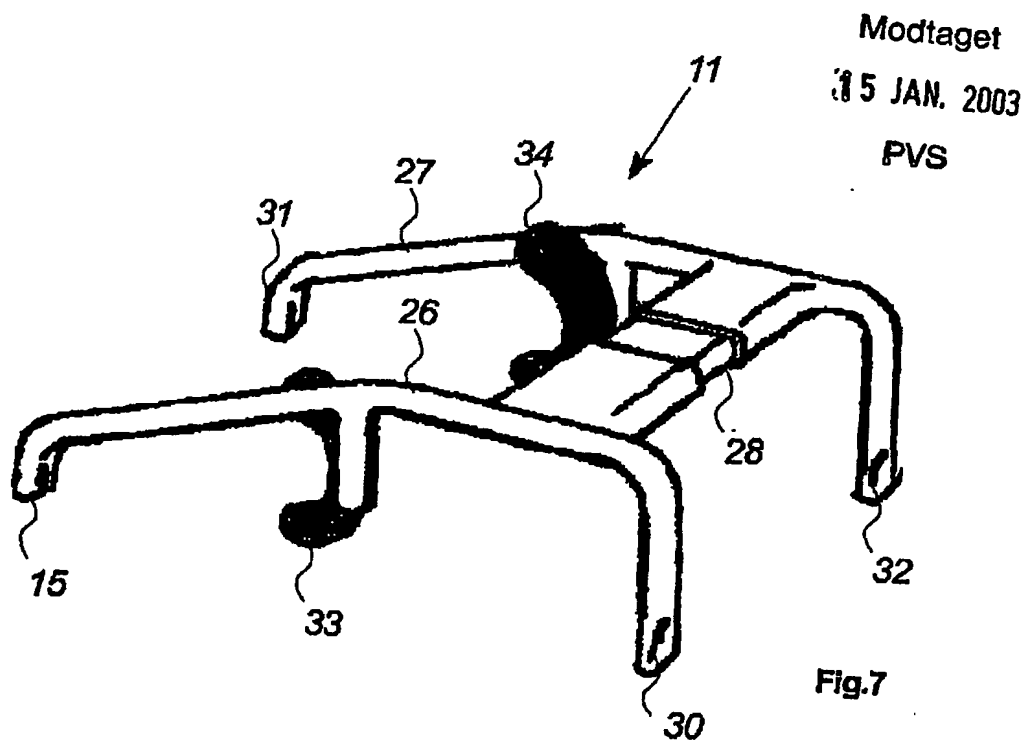
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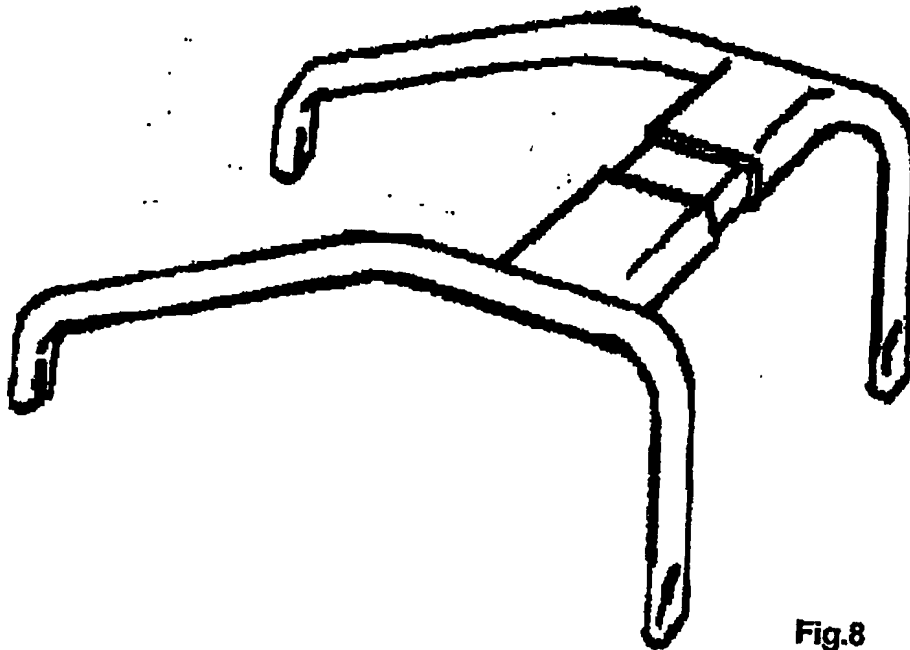


Fig.8

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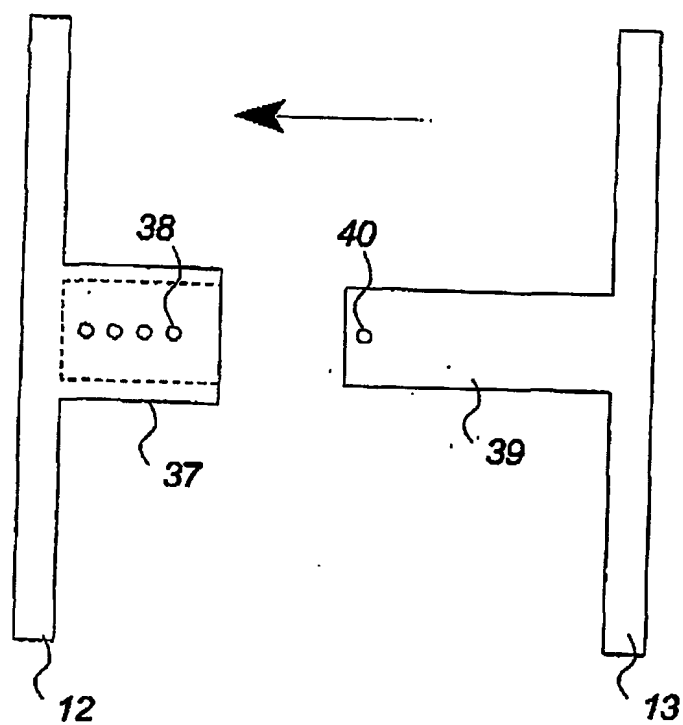


Fig.9

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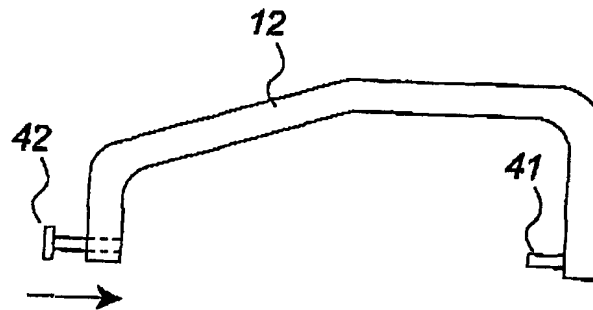


Fig. 10a



Fig. 10b



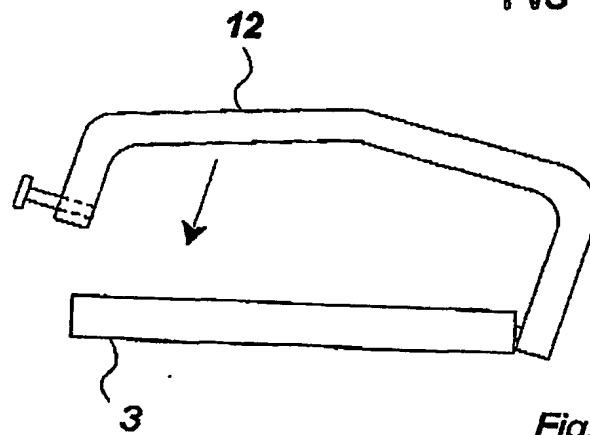
Fig. 10c

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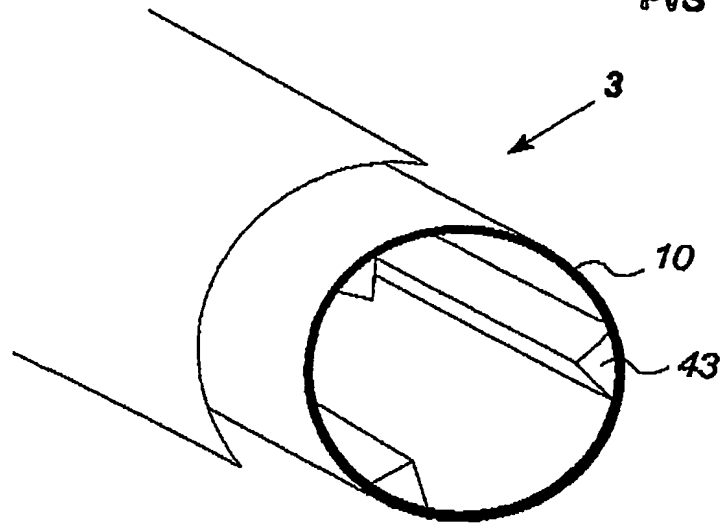


Fig. 12a

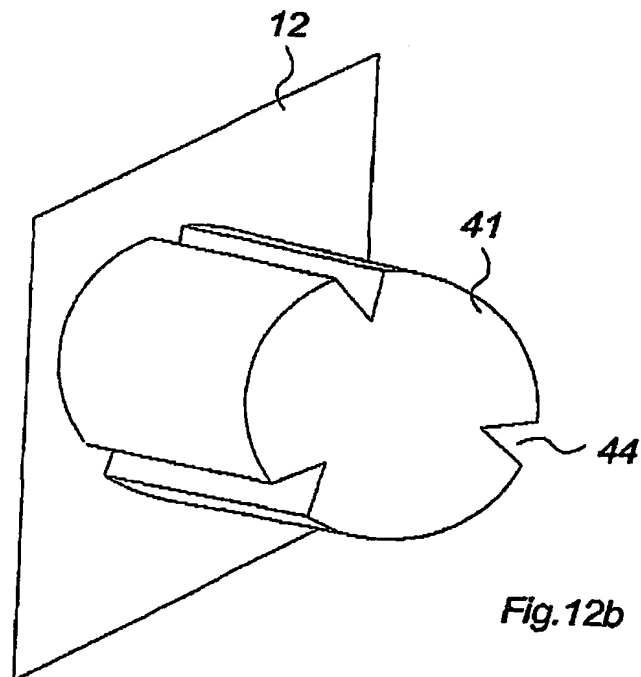


Fig. 12b

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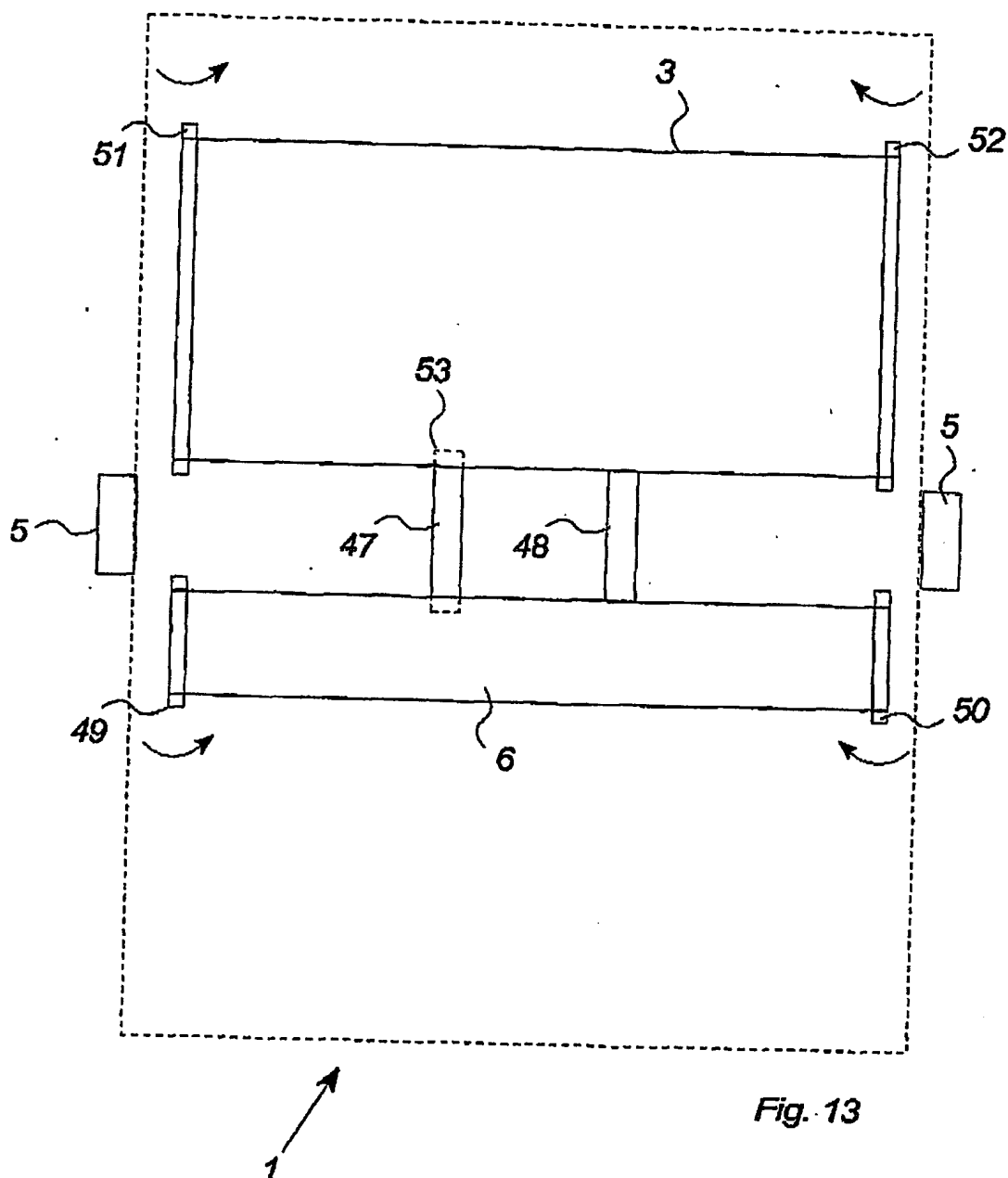


Fig. 13

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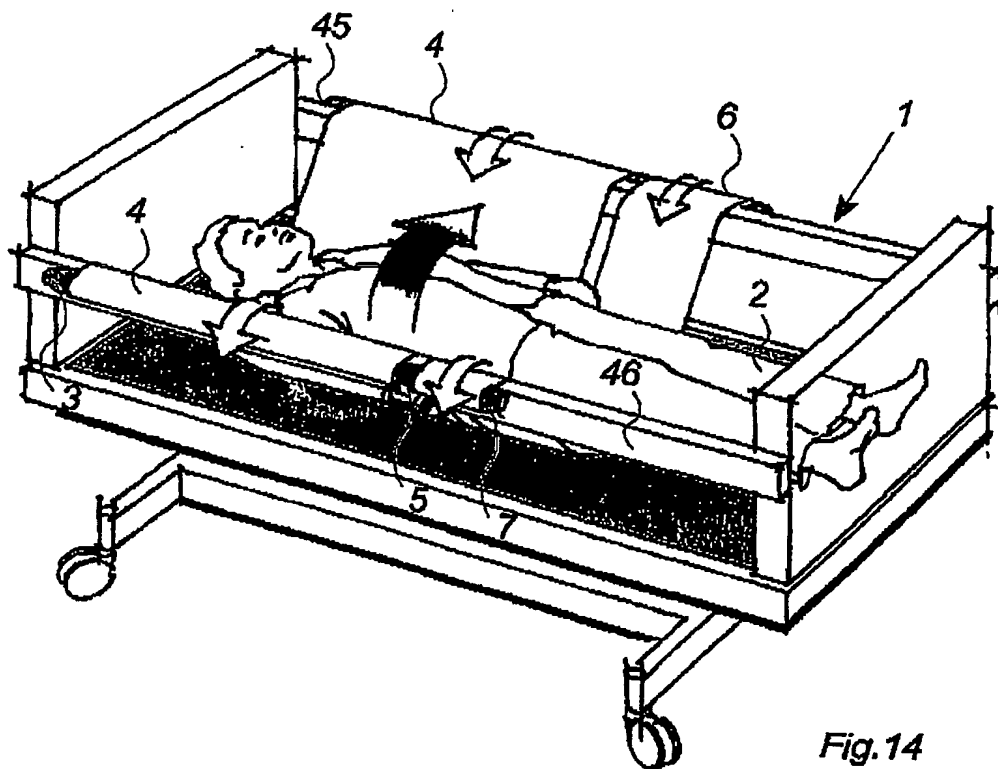


Fig.14